



Caulk
Dentsply

Vari-Mix[®] III AMALGAMATOR

INSTALLATION AND SERVICE MANUAL



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SECTION I

FOREWORD

The Caulk® Vari-Mix® III Amalgamator is a precision engineered and manufactured dental unit. The unit is a variable speed mechanical mixer that operates on ordinary house current. The ability to control the mixing action by adjusting the machine speed (from low through high ranges) makes it a multipurpose mixer for all dental needs. Operator safety is enhanced by the SAF-T™ arm cover which is spring loaded to close over the Capsule Holder Assembly.

CAUTION

The arm cover has been provided for operator safety. DO NOT remove the cover from the mixer or otherwise defeat its purpose.

No special maintenance is required for the Vari-Mix III Amalgamator, but the following precautionary measures should be exercised:

- a. DO NOT place the unit on or next to a radiator or other heat source as this may damage the electrical components.
- b. The unit is portable, but when carrying it from one place to another, handle it with care.
- c. DO NOT change speed or timer controls while amalgamator is in operation.

SECTION II

SPECIFICATIONS

DIMENSIONS

Unit	Height:	4-1/2 in. (11.4 cm)
		5-3/4 in. (14.6 cm) over Arm Cover
	Width:	8-1/4 in. (21.0 cm)
	Depth:	9 in. (22.9 cm)
Power Cord	Length:	66 in. (168 cm)

WEIGHT 9 lbs. 0 oz. (4.1 kg)

ELECTRICAL

Voltage	100V
	115V
	220V
	240V
Current	1A at all Voltages
Frequency	50 Hertz
	60 Hertz

MOTOR SPEEDS

L (Low)	— 3000 rpm
M (Med.)	— 3700 rpm
H (High)	— 4200 rpm

All speeds are ±100 rpm.

SECTION III DESCRIPTION

GENERAL

The Caulk Vari-Mix III Amalgamator has four major components: a speed and timer control board, an electric motor, a capsule holder assembly, and a voltage dropping reactor. See Figure 1.

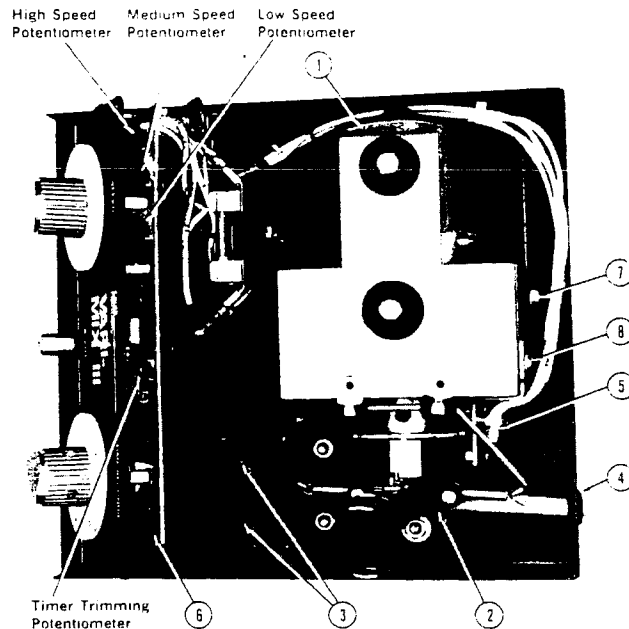


Figure 1. Component Removal — Right Side

SPEED CONTROL AND TIMER CONTROL BOARD

The speed control is adjustable to three ranges; Low (L), Medium (M) and High (H). After the desired speed is selected, the timer is set for the recommended time stipulated in the manufacturer's product directions. The timing dial provides a range of 5 to 20 seconds. The start switch, located in the center of the front panel is then depressed to start the mixing cycle.

ELECTRIC MOTOR

The electric motor used to provide the mixing action for the Caulk Vari-Mix III Amalgamator operates on ordinary house current.

CAPSULE HOLDER ASSEMBLY

The capsule holder assembly, attached to the motor shaft through the use of an angular cut retainer coupling, provides the motion required for thorough product mixing.

VOLTAGE DROPPING REACTOR

The voltage dropping reactors are used to lower the voltage supplied to the electronic circuitry to 12V and each is one component used to stabilize voltage fluctuations.

CAUTION

For best results use Caulk capsules with Vari-Mix III Amalgamator (these are engineered to fit precisely and provide optimum performance). Some brands of capsules may not properly fit the mixer arms and therefore may fly out during operation. Also, oversized capsules may stress and gradually weaken the mixer arms.

SECTION IV INSTALLATION

ELECTRICAL REQUIREMENTS — United States and Canada ONLY.

The standard 3-prong type, grounded, wall outlet is required, supplying 115 volt, 60 hertz alternating current. The ground wire is green and is connected to the chassis.

INSTALLATION

On receipt of equipment, unpack carefully. See that "ON/OFF" switch located on the left side of the unit is in the "OFF" position. Insert power cable into wall outlet.

POST-INSTALLATION CHECK


Turn "ON/OFF" switch, located at side of unit, to "ON." Adjust speed control knob to Low (L) position. Set timer dial to 5 seconds and press switch located in center of front panel. Repeat the procedure for both Medium (M) and High (H) speed positions.


SECTION V SERVICE AND REPAIR

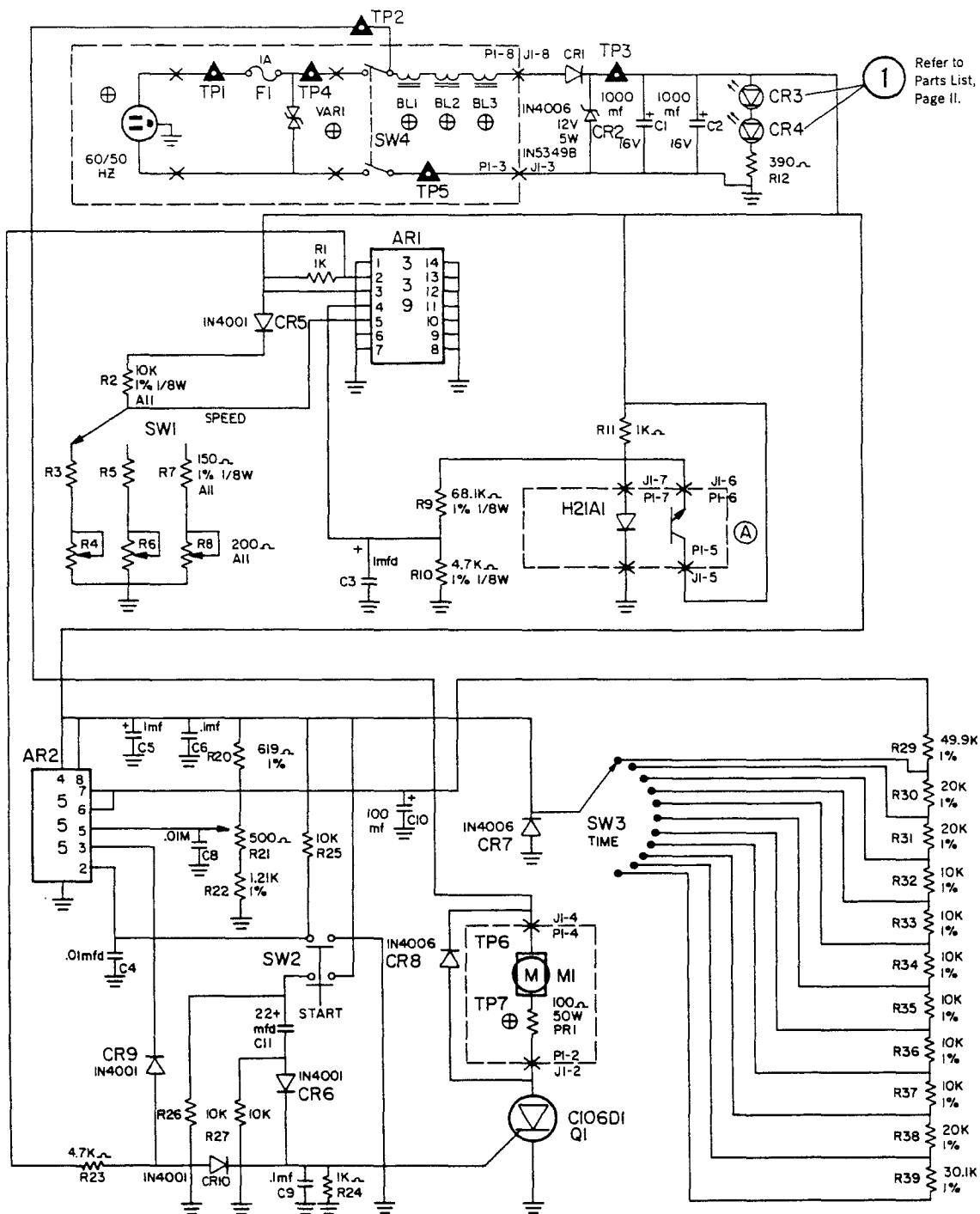
TROUBLESHOOTING

The Caulk Vari-Mix III Amalgamator requires little or no service. If service should be necessary, the following corrective actions will eliminate most difficulties you may encounter. If the corrective actions fail to restore the machine to proper action, the unit should be returned to an authorized Caulk Dealer or the L.D. Caulk Company.

TROUBLESHOOTING AND ANALYSIS

PROBLEM	 AND VOLTAGE	PROBABLE CAUSE	CORRECTIVE ACTION
Amalgamator doesn't operate.	TP1 115	Faulty wall outlet or unit cord.	Check wall outlet and, if faulty, take necessary corrective actions.
			Check unit cord and replace if damaged.
	TP4 115	Open fuse.	Replace fuse.
	Across TP 6 and TP 7 30Ω	Open motor.	Return to factory for repair.
		Defective speed control.	Return to factory for repair.
	TP2 115	Faulty ON-OFF switch.	Replace ON-OFF switch.
	TP3 12V DC	If 0 volts or >30V RMS AC, one or more defective voltage dropping reactors.	Replace BL1, BL2.(BL3 on 200V models ONLY.)
Capsule not properly held in arms.		Cracked or weakened capsule holder arms and backup springs.	Replace with standard arm repair kit.
Motor runs at high speed in all switch positions.	Across TP2-TP7 <100V	Photo interrupter is dirty.	Remove photo interrupter assembly from its mounting, clean with brush, and replace.
		Defective speed control.	Return to factory for repair.
Speed of amalgamator motor varies.		Defective motor.	Return to factory for repair.
		Defective speed control.	Return to factory for repair.
		Excessive end play in motor.	Return to factory for repair.
Amalgamator doesn't stop running.		Defective speed control.	Return to factory for repair.

 Test point locations. See Figure 2.
All test point voltages are AC except TP3 (VDC). TP5 Common.

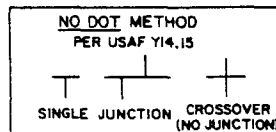


(A) H21A1 OPTO-INTERRUPTER MOUNTED ON MOTOR SHAFT. ALL RESISTORS 1/4 WATT, 5% OR AS NOTED.
ALL 1% RESISTORS WITH TEMPERATURE COEFFICIENT OF 50 PPM NUMBERS 2-8, P.C. BOARD CONNECTOR.

(B) ALL AREAS OUTSIDE DOTTED ENCLOSURES ARE INCLUDED ON P.C. BOARD PC-1.

(C) P1 = CONNECTOR, J1 = P.C. BOARD, P1-1 & P1-9 ARE KEYING PINS.

(D) TEST POINT LOCATIONS. TP-5 IS COMMON.



	90V - 132V	180V - 262V
BL1	89G922 G.E.	89G531 G.E.
BL2	89G922 G.E.	89G531 G.E.
BL3	SHORT	89G531 G.E.
VAR1	V130LA10A G.E.	V250LA10A G.E.
PR1	SHORT	100 50W 1% Dale

Figure 2. Electrical Schematic

COMPONENT REMOVAL AND REPLACEMENT

The following steps describe the required removal and replacement of major components, assemblies, subassemblies or individual parts necessary to accomplish suitable corrective action. Disassembly, however, should be limited to the extent necessary to gain access to the faulty part. Replacement parts are indicated, in the accompanying views, by the presence of an identity number.

In the event that trouble of an electrical nature occurs requiring wiring or electrical component changes, reference should be made to the Electrical Schematic, Figure 2.

CAUTION

Prior to removal of the unit cover, disconnect the power cord from the power source.

1. UNIT HOUSING REMOVAL — See Figure 3.

- a. Remove three mounting screws (8) and lift housing from unit.

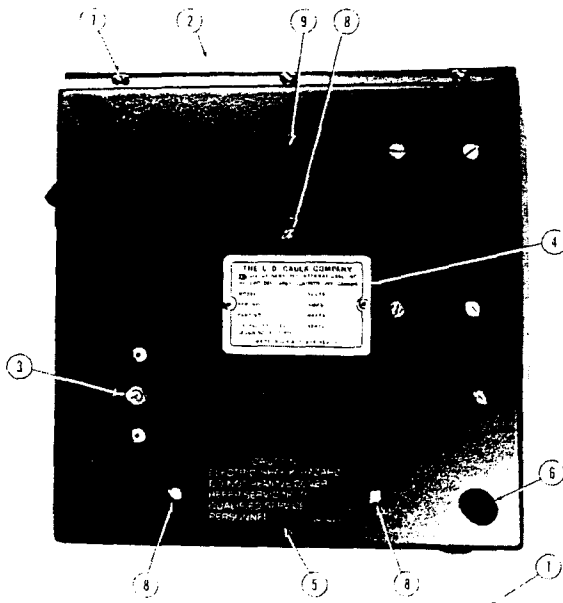


Figure 3. Bottom Panel

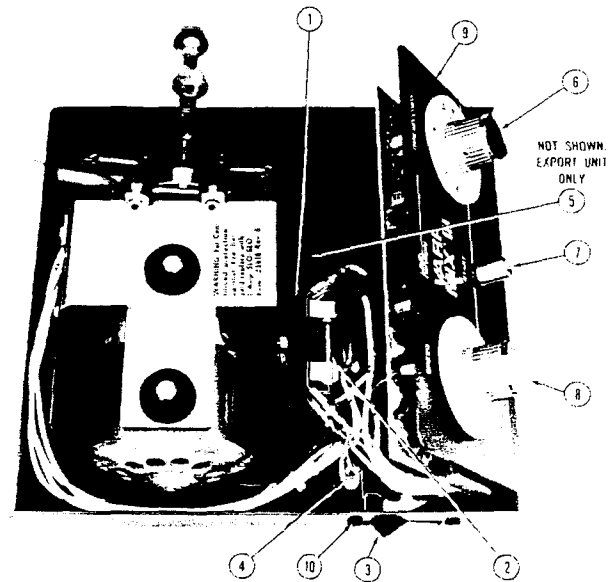


Figure 4. Component Removal — Left Side

2. REMOVING "ON/OFF" SWITCH — See Figure 4.

- a. Remove two pan head screws (10) securing switch (3) to base assembly.
- b. Disconnect electrical leads and remove switch.

3. CAPSULE ARM AND BACKUP SPRING REPLACEMENT — See Figure 5.

- a. With the unit housing removed, disconnect the bearing clamp springs (1) from the spring holder arm.
- b. Remove capsule holder arms and backup springs by removing the two screws (2). Discard all removed parts.
- c. Assemble the new capsule holder arms and backup springs to the yoke using the new screws, lockwashers, and nuts supplied in the kit. Refer to Figure 5 for proper positioning of parts. Tighten the screws as securely as possible, using screwdriver and 1/4-inch wrench.
- d. Assemble the new extension springs and spring screws to the yoke. Turn the screws (3) into the yoke. Turn only until the head contacts the yoke flange.

CAUTION

Do not overtighten the extension spring screws.

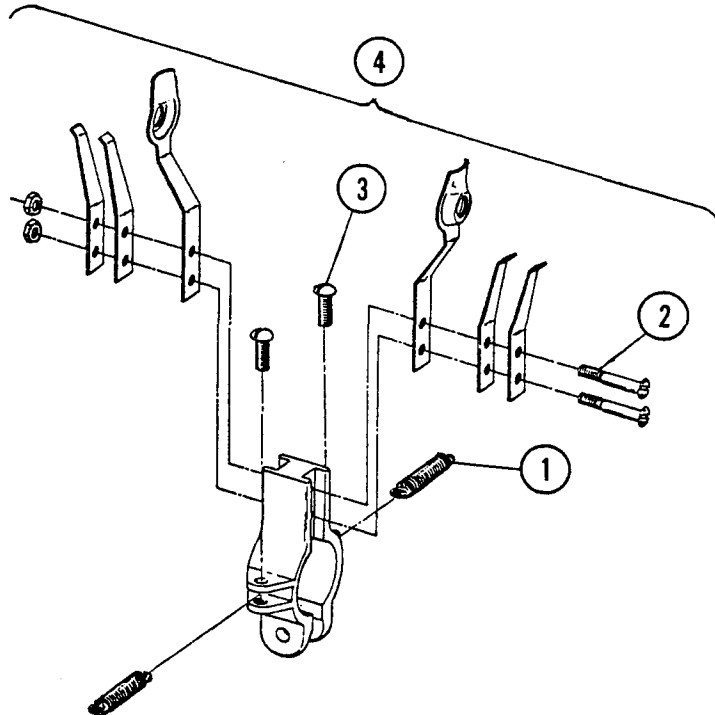


Figure 5. Capsule Arms and Backup Springs

4. RETAINER AND COUPLING ASSEMBLY REPLACEMENT — See Figure 1.

- a. Detach the mounting screws (8) of the photo interrupter (5) and pull the photo interrupter away from the timer hub.
- b. Disconnect the extension springs from the spring holder arms. Use a 1/8" Allen wrench to loosen the motor shaft coupling set screw. Slide the assembly off the motor shaft.

- c. Push the replacement retainer and coupling assembly as far as it will go onto the motor shaft making certain the flat side of the shaft is in the up position. Use Allen wrench to securely tighten set screw onto motor shaft. Attach the two extension springs to their respective spring holder arm.
- d. Replace the photo interrupter assembly. Check that the opening of the photo interrupter is centered on the timer hub and that there is no contact between the timer hub and the photo interrupter.
- e. Replace the unit housing and screws.

5. ASSEMBLY PROCEDURES.

Assembly procedures are the reverse of disassembly procedures. Avoid excessive tightening of cover screws which could damage the housing.

CALIBRATION PROCEDURES

1. TIME Calibration

- Set the Timer Knob to 20 seconds.
- Simultaneously push the unit START button and activate a stopwatch.
- Deactivate the stopwatch when the unit stops operating.
 - The elapsed time should be 20 seconds ± 1 .
- If the time is out of specification, remove the unit cover to complete the calibration procedure.
- Refer to Figure 1 for identification of the timer trimming potentiometer (NOTE: The references to the clockwise and counterclockwise rotations are looking from above the unit down onto the potentiometer.)
 - Clockwise rotation increases the timer cycle.
 - Counterclockwise rotation decreases the timer cycle.
 - 20° rotation of potentiometer equals approximately 1 sec. adjustment.
- Use a sharp knife to cut the sealant away from the PC board to allow rotational adjustment of the potentiometer. (NOTE: It is not necessary to remove the sealant from the potentiometer, only to separate the sealant from the PC board.)
- Simultaneously push the unit START button and activate a stopwatch.
- Deactivate the stopwatch when the unit stops operating.
- Adjust the potentiometer to suit the time variation. Repeat the time measuring and adjustment procedure until the unit is within specification.
- Reseal the potentiometer. Use GE RTV108 or equivalent as a sealant.
- Repeat the time measuring procedure to verify the potentiometer setting and to insure that the application of sealant did not change the setting.
- Allow the unit to stand for 24 hours before using to allow the sealant to cure completely.

2. SPEED Calibration

- Warm up Strobotac Type 1531-A (or equivalent) for one-half hour.
- Use a beam balance to adjust the weight of capsule and pestle to 4.60 ± 0.02 grams with silver alloy or equivalent non-agglomerating ballast material. (Weight of capsule, pestle and ballast totals 4.60 grams.)
- After the warm-up period, start synchronous motor and set Strobotac at 1800 rpm. Follow manufacturer's instruction for the specific Strobotac and adjust the Strobotac to proper speed by turning the coarse and fine adjustment screws.
- Set Strobotac to 3600 rpm and adjust speed if necessary as in step above.
- Connect amalgamator plug into powerstat and adjust voltage to 115 ± 1 VAC; use the Simpson voltmeter or equivalent to confirm input.
- Place loaded capsule between the amalgamator retention arms.
- Position Strobotac behind the unit so the light shines across the arm opening from rear toward the front. Care should be taken that strobe flashes do not reach the Photo Interrupter inside the unit.
- Set the Strobotac to 3000 rpm.
- Set the TIMER knob to 20 seconds.
- Set the SPEED knob to L (low).
- Push START button and check accuracy of motor speed.
- Set Strobotac to 3700 rpm, SPEED knob to M (medium) and repeat check on motor speed.
- Set Strobotac to 4200 rpm, SPEED knob to H (high) and repeat check on motor speed.
- If motor speed inaccuracies have been noted, remove the cover from the Vari-Mix III unit. Refer to Figure 1 and use a sharp knife to separate the sealant on the appropriate potentiometer from the P.C. board. (NOTE: It is not necessary to remove the sealant from the potentiometers, only to separate the sealant from the P.C. board.)
- Position Strobotac behind the unit so the light shines from the rear of the unit towards the front. Care must be taken to shield the Photo Interrupter from strobe flashes and from ambient light. (If possible, work in shadow or very low lighting.)
- Set Strobotac to 3000 rpm.
- Set SPEED knob to L (low).
- Push START button and adjust "low" speed potentiometer clockwise/counterclockwise until arms appear to stop. Clockwise rotation reduces speed.
- Repeat procedure with Strobotac set at 3700 rpm, SPEED knob set at M (medium) and adjust the "medium" speed potentiometer until arms appear to stop.
- Repeat procedure with Strobotac set at 4200 rpm, SPEED knob set at H (high) and adjust the "high" speed potentiometer until arms appear to stop.

- Before sealing the three potentiometers, replace the unit cover on the unit (to block out ambient light) and recheck the speeds at the three knob settings.
L (low) = 3000 rpm All speed settings
M (medium) = 3700 rpm should be within
H (high) = 4200 rpm ± 100 rpm
- Remove the unit cover and apply GE RTV 108 sealant or equivalent to the potentiometers.
- Replace the unit cover and recheck speeds again to determine that applying the sealant did not change the settings.
- Allow the unit to stand for 24 hours before using to allow the sealant to cure.

SECTION VI PARTS LIST — VARI-MIX III

FIG.	CALL-OUT	115V 60Hz	100V 60Hz	100V 50Hz	220V 60Hz	220V 50Hz	240V 50Hz	NAME	ITEM NUMBER	DESCRIPTION
1	1	●	●	●	●	●	●	*Motor	972100	1/15 HP 5000 RPM Thermally protected
1	2	●	●	●	●	●	●	Repair Kit Head Assembly Complete	672150	
1	3	●	●	●				Reactor, Voltage Dropping	972102	90/130V #89G922
1	3				●	●	●	Reactor, Voltage Dropping	972103	180/260V #89G531
1	4	●	●	●	●	●	●	Grommet	972104	3/8" I.D. x 5/8" O.D. #230
1	5	●	●	●	●	●	●	*Interrupter Assembly, Photo	972105	#H21A1
1	6	●	●	●	●	●	●	*Board, Printed Circuit	972106	
1	7	●	●	●	●	●	●	Screw, Hex Hd Slotted	972107	#10 Sheet metal x 1/2" long
1	8	●	●	●	●	●	●	Screw, Rd. Hd Slotted	972108	
2	1	●	●	●	●	●	●	LED, Data Display	972144	#200 MA
3	1	●	●	●				Power Cord	972109	
3	1				●	●	●	Power Cord	972110	
3	2	●	●	●	●	●	●	Cover Assembly (incl Arm Cover)	972111	
3	3	●	●	●	●	●	●	Mount, Isolation	972112	Lord #100-PD-1
3	4	●						Plate, Identification	972113	115V 60Hz
3	4		●					Plate, Identification	972114	100V 60Hz
3	4			●				Plate, Identification	972115	100V 50Hz
3	4				●			Plate, Identification	972116	220V 60Hz
3	4					●		Plate, Identification	972117	220V 50Hz
3	4						●	Plate, Identification	972118	240V 50Hz
3	5	●	●	●	●	●	●	Plate, Caution	972119	
3	6	●	●	●	●	●	●	Foot, Rubber	972120	#G-2448-455
3	7	●	●	●	●	●	●	Screw, Pan Hd. Slotted	972121	#8-32 x 3/8" long
3	8	●	●	●	●	●	●	Screw, Case Assembly	972122	#8-32 x 3-1/2" long Rd Hd Slotted
3	9	●	●	●	●	●	●	Screw, Ground	972123	#10-32 x 3/8" Green
4	1	●	●	●	●	●	●	Block, Fuse	972124	Littelfuse #350-330
4	2	●	●	●	●	●	●	Fuse	972125	Slo Blo 1A 250V
4	3	●	●	●	●	●	●	Switch	972126	Carling TIGK 61-2L-BL-AXDEI 6A @ 125V 1/4 HP
4	4	●	●	●				Wire and Varistor	972127	#V130LA10
4	4				●	●	●	Wire and Varistor	972128	#V250LA20
4	5				●	●	●	Resistor	972129	#RH50, 50W 100Ω
4	6	●	●	●	●	●	●	Knob, Timer	972130	
4	7	●	●	●	●	●	●	Button, Start	972131	
4	8	●	●	●	●	●	●	Knob, Speed Control	972132	
4	9	●	●	●	●	●	●	*Panel Assembly, Front	972133	
4	10	●	●	●	●	●	●	Screw, Pan Hd. Slotted	972134	#6-32 x 3/8" long
5	4	●	●	●	●	●	●	Repair Kit, Arms	672015	

*Factory repair ONLY.

WARRANTY

CAULK® VARI-MIX® III AMALGAMATOR

The Caulk VARI-MIX III Amalgamator is designed for use in a dental office and this warranty is not applicable to other uses. The Caulk VARI-MIX III Amalgamator is guaranteed against defects arising from faulty materials or workmanship for one (1) year from date of delivery. In the event of such a defect, Caulk will repair or replace the Caulk VARI-MIX III Amalgamator or necessary parts therein, in its discretion, and such repair or replacement shall be the sole remedy of this warranty. This warranty extends only to the original purchaser and is subject to the following conditions:

1. The Warranty Registration Card is completed and returned to The L. D. Caulk Company within two (2) weeks of the date of installation.
2. Any servicing of the Caulk VARI-MIX III Amalgamator must be performed by trained Caulk Dealer Service Personnel.
3. The Caulk VARI-MIX III Amalgamator must not be subjected to abuse or improper installation or repair by other than trained Caulk Dealer Service Personnel.
4. This warranty will not apply to replacement parts other than Caulk supplied replacement parts.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THIS DESCRIPTION. Caulk neither assumes, nor authorizes any person to assume for it, any other liability in connection with the sale and use of the Caulk VARI-MIX III Amalgamator.

DAMAGES ARE LIMITED STRICTLY TO REPLACEMENT OF THE CAULK VARI-MIX III AMALGAMATOR. CAULK EXPRESSLY DISCLAIMS LIABILITY FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE CAULK VARI-MIX III AMALGAMATOR.

Claims covered by this warranty will be honored when presented through your Caulk Dental Dealer within one (1) month from discovery of defect.